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Selected Publications in Image Understanding and Computer Vision from 1974 to 1983

J.G. Verly

18 April 1985

Lincoln Laboratory
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
LEXINGTON, MASSACHUSETTS



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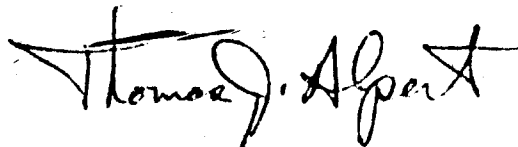
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SELECTED PUBLICATIONS IN IMAGE UNDERSTANDING
AND COMPUTER VISION FROM 1974 TO 1983

J.G. VERLY

Group 21

TECHNICAL REPORT 716

18 APRIL 1985

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INTRODUCTION

This report contains a list of selected publications in image understanding and computer vision. The list was compiled as part of our work for the DARPA-sponsored Autonomous IR Sensor Technology program, and the choice of references was directly influenced by the needs of that program. Therefore, emphasis has been placed on theories, techniques, and systems for interpreting complex imagery; the more classical fields of image processing, e.g., filtering, enhancement, restoration, coding, and reconstruction, have not been included. The topics of edge detection and region segmentation as well as the well-known scene analysis problems of shape recognition from stereo, shading, texture, and motion have also been excluded.

The bibliography covers the last decade (1974-1983) and is based on the yearly surveys published by A. Rosenfeld in the Journal initially called *Computer Graphics and Image Processing (CGIP)* and now *Computer Vision, Graphics, and Image Processing (CVGIP)*. The corresponding references are:

- [1] A. Rosenfeld, "Picture Processing :1983," CVGIP 26, 1984, 347-393.
- [2] A. Rosenfeld, "Picture Processing :1982," CVGIP 22, 1983, 339-387.
- [3] A. Rosenfeld, "Picture Processing :1981," CGIP 19, 1982, 35-75.
- [4] A. Rosenfeld, "Picture Processing :1980," CGIP 16, 1981, 52-89.
- [5] A. Rosenfeld, "Picture Processing :1979," CGIP 13, 1980, 46-79.
- [6] A. Rosenfeld, "Picture Processing :1978," CGIP 9, 1979, 354-393.
- [7] A. Rosenfeld, "Picture Processing :1977," CGIP 7, 1978, 211-242.
- [8] A. Rosenfeld, "Picture Processing :1976," CGIP 6, 1977, 157-183.
- [9] A. Rosenfeld, "Picture Processing :1975," CGIP 5, 1976, 215-237.
- [10] A. Rosenfeld, "Picture Processing :1974," CGIP 4, 1975, 133-155.

These surveys contain a total of 7,486 references of which 1,254 were selected for inclusion in this report. The table below shows the details of the selection process on a yearly basis.

YEAR	TOTAL REFERENCES	NUMBER SELECTED
83	1,138	201
82	1,185	208
81	982	147
80	897	131
79	700	160
78	819	153
77	609	103
76	461	67
75	354	43
74	341	41
TOTAL	7,486	1,254

In this report, the references are organized by years, starting with 1983, and also by subjects within each year. The subject classes and titles are those of Rosenfeld's surveys and the reference numbers have also been kept unchanged to simplify the task of comparing this bibliography with the original source. Some editing was required to eliminate problems due to the use of "ibid" in the surveys and to maintain the same set of Journal abbreviations throughout the bibliography.

This report has been found extremely useful in the context of the Automous IR Sensor Technology program, but it should be of interest to any researcher involved in image understanding and computer vision. It can be read in a few hours and provides a fairly accurate view of the trends in the fields over the last decade.

ABBREVIATIONS

AI	Artificial Intelligence
BC	Biological Cybernetics
CACM	Communications of the ACM
CG	Computer Graphics (ACM Quarterly)
CGA	IEEE Computer Graphics and Applications
CGIP	Computer Graphics and Image Processing
CS	Computing Surveys
CVGIP	Computer Vision, Graphics, and Image Processing
I&C	Information and Control
IFIP	IFIP Congress Proceedings
IJRR	International Journal of Robotics Research
IPL	Information Processing Letters
IS	Information Sciences
IVC	Image and Vision Computing
JACM	Journal of the ACM
J. CYBER	Journal of Cybernetics
MI	Machine Intelligence
PACM	Proceedings of the ACM
P-IEEE	Proceedings of the IEEE
P-NCC	Proceedings of the National Computer Conference
PR	Pattern Recognition
PRL	Pattern Recognition Letters
P-SPIE	Proceedings of the SPIE
SFCS	Symposium on Foundations of Computer Sciences
SIAM JAM	SIAM Journal of Applied Mathematics
SIAM JC	SIAM Journal of Computing
SP	Signal Processing
STOC	Symposium on Theory of Computing
T-AC	IEEE Transactions on Automatic Control
T-ASSP	IEEE Transactions on Acoustics, Speech, and Signal Processing
T-CAS	IEEE Transactions on Circuits and Systems
T-COMP	IEEE Transactions on Computers
T-IT	IEEE Transactions on Information Theory
T-PAMI	IEEE Transactions on Pattern Analysis and Machine Intelligence
T-SE	IEEE Transactions on Software Engineering
T-SMC	IEEE Transactions on Systems, Man, and Cybernetics

APPENDIX A: 1983

A. General References

A.1. Meetings

1. Army Research Office Workshop on Unsupervised Image Classification (Providence, RI, April 14-16, 1983).
2. Proceedings: Trends & Applications, 1983: Automating Intelligent Behavior-Applications and Frontiers (Gaithersburg, MD, May 25-26, 1983), IEEE Publ. 83CH1887-9.
3. Proceedings, CVPR '83: IEEE Computer Society Conference on Computer Vision and Pattern Recognition (Washington, DC, June 19-23, 1983), IEEE Publ. 83CH1891-1.
4. L. S. Baumann, Ed., Proceedings: Image Understanding Workshop (Arlington, VA, June 23, 1983), Science Applications, Inc., McLean, VA, 1983.
5. Proceedings of the National Conference on Artificial Intelligence (AAAI-83, Washington, DC, August 22-26, 1983), American Association for Artificial Intelligence, Palo Alto, CA, 1983.
6. Workshop on Sensors and Algorithms for 3D Machine Perception (Washington, DC, August 22-23, 1983).
7. A. G. Tescher, Ed., Applications of Digital Image Processing VI (San Diego, CA, August 23-26, 1983), P-SPIE 432.
8. (IEEE Computer Society) Workshop on Applied Imagery Pattern Recognition (College Park, MD, September 27-28, 1983).
9. Third ASSP Workshop on Multidimensional Signal Processing (Lake Tahoe, CA, October 19-21, 1983).
10. (Army) Workshop on Autonomous Ground Vehicles (Leesburg, VA, October 24-26, 1983).
11. (Department of Energy) Workshop on Research Goals and Priorities in Intelligent Machines (Leesburg, VA, November 2-4, 1983).
12. Symposium on Intelligence Applications of Artificial Intelligence (Langley, VA, December 6-8, 1983).
13. IEE International Conference on Electronic Image Processing (York, UK, July 26-29, 1982).

14. R. M. Haralick, Ed., Pictorial Data Analysis (Proceedings of the NATO Advanced Study Institute on Pictorial Data Analysis, Bonas, France, August 1-12, 1982), Springer, Berlin, 1983.
15. A. Oosterlinck and A. G. Tescher, Eds., Applications of Digital Image Processing (Geneva, Switzerland, April 19-22, 1983), P-SPIE 397.
16. Proceedings of the first IPA [Information Processing Association of Israel] Conference on Image Processing, Computer Graphics, and Pattern Recognition (Beersheva, Israel, June 1983).
17. P. Johansen and P. W. Becker, Eds., Proceedings of the Third Scandinavian Conference on Image Analysis (Copenhagen, Denmark, July 12-14, 1983), Studentlitteratur, Lund, Sweden, 1983.
18. Alan Bundy, Ed., Proceedings of the Eighth International Joint Conference on Artificial Intelligence (IJCAI-83, Karlsruhe, FRG, August 8-12, 1983), W. Kaufmann, Inc., Los Altos, CA, 1983.
19. Proceedings, AUTOBILD '83 (Jena, DDR, September 5-10, 1983), Friedrich-Schiller-Universität, Jena, 1983.
20. British Pattern Recognition Association Second International Conference on Pattern Recognition (Oxford, UK, September 19-21, 1983).
21. Mustererkennung 1983 (Fifth DAGM Symposium, Karlsruhe, FRG, October 11-13, 1983).
- A.2. Journals, Handbooks
22. K. Baker, Ed., Image and Vision Computing, Butterworths, UK, 1983.
23. R. M. Haralick, Guest Ed., [Special Issue on Computer Vision], CVGIP 22(1), April 1983, 1-203.
24. J. R. Ullmann, Guest Ed., Special Double Issue with papers for the Second International Conference on Pattern Recognition of the British Pattern Recognition Association (see [20]), PRL 1(5,6), July 1983, 275-505.
25. P. R. Cohen and E. A. Feigenbaum, Eds., The Handbook of Artificial Intelligence, Vol. 3, W. Kaufmann, Los Altos, CA, 1982. (Ch. 13: Vision).
26. P. R. Krishnaiah and L. N. Kanal, Eds., Handbook of Statistics, Vol. 2: Classification, Pattern Recognition, and Reduction of Dimensionality, North-Holland, Amsterdam, 1982.

A.3. Textbooks, Surveys

- 27. O. D. Faugeras, Ed., Fundamentals in Computer Vision-An Advanced Course, Cambridge University Press, Cambridge, UK, 1983.
- 29. A. Sloman, Image interpretation: the way ahead?, in [81], 380-401.
- 30. A. Rosenfeld, Why computers can't see (yet), Abacus 1(1), Fall 1983, 17-26.
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- 32. A. Rosenfeld, Picture processing: 1982, CVGIP 22, 1983, 339-387.

A.4. Graphics

- 35. SIGGRAPH '83 Conference Proceedings (Detroit, MI, July 25-29, 1983), CG 17(3), July 1983.

A.6. Perception

- 80. J. Beck, B. Hope, and A. Rosenfeld, Eds., Human and Machine Vision (Proceedings of a Workshop, Denver, CO, August 10-12, 1981), Academic Press, New York, 1983.
- 81. O. J. Braddick and A. C. Sleight, Eds., Physical and Biological Processing of Images (Proceedings of an International Symposium, London, England, September 27-29, 1982), Springer, Berlin, 1983.

D. Hardware and Software

- 271. M. J. B. Duff, Ed., Computing Structures for Image Processing (Proceedings of a Workshop held in Abingdon, UK, May 25-28, 1982), Academic Press, London 1983.
- 276. IEEE Computer Society Workshop on Computer Architecture for Pattern Analysis and Image Database Management (Pasadena, CA, October 12-14, 1983), IEEE Publ. 83CH1929-9.

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- 309. K. Preston, Jr., Cellular logic computers for pattern recognition, Computer 16(1), 1983, 36-47.
- 317. T. J. Fountain, The development of the CLIP7 image processing system, PRL 1, 1983, 331-339.

D.2. Cellular Arrays, etc.

- 328. International Workshop on Parallel Processing by Cellular Automata (Berlin, DDR, September 15-16, 1982).
- 341. S. L. Tanimoto, A Boolean matching operator for hierarchical cellular logic, in [276], 152, 253-256.

D.3. Operations, Data Structures, Software, Databases

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- 356. J. Naor and S. Peleg, Image compression and filtering using pyramid data structures, in [18], 1086-1088.
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- 359. K. Preston, Jr., Gray level image processing by cellular logic transforms, T-PAMI 5, 1983, 55-58.
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E. Pictorial Pattern Recognition

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E.2. Industrial Automation

433. A. Pugh, Robot Vision, IFS Publications, Bedford, UK, 1982.
449. T. N. Mudge and T. S. Abdel-Rahman, Case study of a program for the recognition of occluded parts, in [276], 56-60.
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472. H. P. Moravec, The Stanford cart and the CMU rover, P-IEEE 71, 1983, 872-884.

E.4. Remote Sensing, Reconnaissance, Cartography

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506. Airborne Reconnaissance VII (San Diego, CA, August 23-24, 1983), P-SPIE 424.
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532. L. F. Pau and M. Y. El Nahas, An Introduction to Infrared Image Acquisition and Classification Systems, Wiley, New York, 1983.

E.5. Miscellaneous

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- 567. D. Kuan, Three-dimensional feature extraction, in [3], 388-390.
- 568. T. J. Laffey, R. M. Haralick and L. T. Watson, The topographic primal sketch and its application to passive navigation, in [4], 304-317.
- 575. B. Gil, A. Mitiche, and J. K. Aggarwal, Experiments in combining intensity and range edge maps, CVGIP 21, 1983, 395-411.
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- 610. O. D. Faugeras, M. Hebert, and E. Pauchon, Segmentation of range data into planar and quadric patches, in [3], 8-13.
- 625. K. Prasadny, Waveform segmentation and description using edge preserving smoothing, CVGIP 23, 1983, 327-333.
- 636. C. J. Oddy and A. J. Rye, Segmentation of SAR images using a local similarity rule, PRL 1, 1985, 443-449.

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663. T. E. Weymouth, J. S. Griffith, A. R. Hanson, and E. M. Riseman, Rule-based strategies for image interpretation, in [5], 429-432.
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G. Matching and Time-Varying Imagery

G.1. Matching

668. T. D. Williams and F. Glazer, Comparison of feature operators for use in matching image pairs, in [720], 395-423.

- 669. D. J. Burr, Matching elastic templates, in [81], 260-270.
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- 716. H. Bunke and G. Allermann, Inexact graph matching for structural pattern recognition, PRL 1, 1983, 245-253.

G.2. Motion

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- 783. A. R. Eruss and B. K. P. Horn, Passive navigation, CVGIP 21, 1983, 3-20.

H. Shape and Pattern

H.1. Representation

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- 806. A. Rosenfeld, Hierarchical representation: computer representations of digital images and objects, in [27], 315-324.

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- 816. P. Flajolet and C. Puech, Tree structures for partial match retrieval, SFCS, 282-268.
- 827. J. Strackee and J. J. Nagelkerke, On closing the Fourier descriptor presentation, T-PAMI 5, 1983, 660-661.
- 828. T. R. Crimmins, A complete set of Fourier descriptors for two-dimensional shapes, T-SMC 12, 1982, 848-855.

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- 831. D. Lucas, Moment techniques in picture analysis, in [3], 178-187.
- 832. F. Badi'i and B. Peikari, Invariant numerical shape modeling, in [3], 190-191.
- 836. J. S. Wiejak, Moment invariants in theory and practice, IVC 1, 1983, 79-83.
- 840. M. Pavel, "Shape theory" and pattern recognition, PR 16, 1983, 349-356.
- 843. J. F. Boyce and W. J. Hossack, Moment invariants for pattern recognition, PRL 1, 1983, 451-456.
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- 846. S. K. Pal, R. A. King, and A. A. Hashim, Image description and primitive extraction using fuzzy sets, T-SMC 13, 1983, 94-100.

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- 894. J. R. C. Fairfield, Segmenting blobs into subregions, T-SMC 13, 1983, 363-384.

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J. Formal Models

J.1. Syntactic Pattern Recognition

978. T. C. Henderson, Syntactic and structural methods (I,II), in [27], 273-282, 283-292.
979. K. S. Fu, A syntactic-semantic approach to pictorial pattern analysis, in [14], 133-146.
981. A. Giordana and L. Saitta, A non-left-to-right parser for syntactic shape recognition, in [276], 143-150.
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989. G. C. Stockman and L. N. Kanal, Problem reduction representation for the linguistic analysis of waveforms, T-PAMI 5, 1983, 287-298.
990. Q. Y. Shi and K. S. Fu, Parsing and translation of (attributed) expansive graph languages for scene analysis, T-PAMI 5, 1983, 472-485.

J.2. Formal Languages

1016. M. Toda, K. Inoue, and I. Takanami, Two-dimensional pattern matching by two-dimensional on-line tessellation acceptors, Theor. Comp. Sci. 22, 1983, 179-194.

K. Three-Dimensional Scene Analysis

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K.1. Representation, Geometry

1022. Symposium on Computer-Aided Geometry Modeling (Hampton, VA, April 20-22, 1983).

1023. Panel on Solid Modeling, in [35], 163-165.
1024. Panel on Solid Modeling: a User Perspective, in [35], 357.
1025. Symposium on Solid Modeling by Computers: from Theory to Applications (Warren, MI, September 25-27, 1983).
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APPENDIX B: 1982

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report contains a list of selected publications in image understanding and computer vision. The list was compiled as part of our work for the DARPA-sponsored Autonomous IR Sensor Technology program, and the choice of references was directly influenced by the needs of that program. Therefore, emphasis has been placed on theories, techniques, and systems for interpreting complex imagery; the more classical fields of image processing, e.g., filtering, enhancement, restoration, coding, and reconstruction, have not been included. The topics of edge detection and region segmentation as well as the well-known scene analysis problems of shape recognition from stereo, shading, texture, and motion have also been excluded. The bibliography covers the last decade (1974-1983) and is based on the yearly surveys published by A. Rosenfeld in the Journal initially called "Computer Graphics and Image Processing (CGIP)" and now "Computer Vision, Graphics, and Image Processing (CVGIP)".		